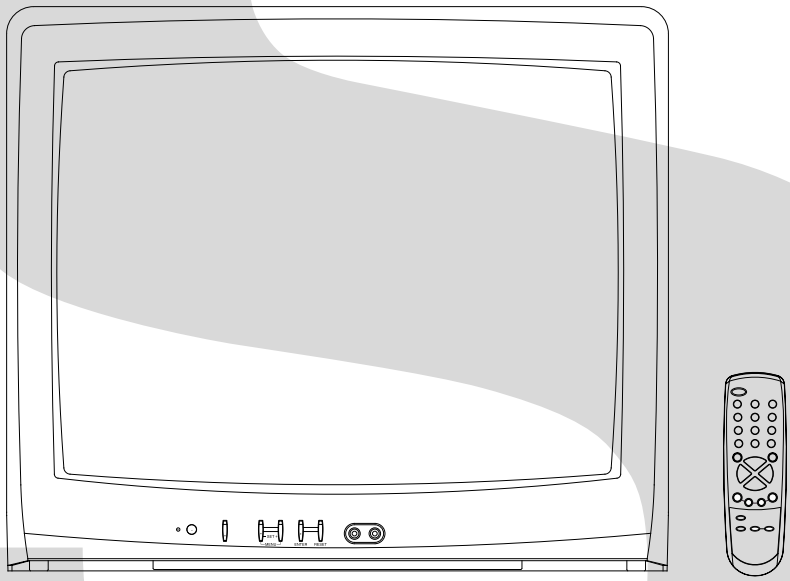
TOSHIBA

FILE NO. 050-200406

SERVICE MANUAL

COLOR TELEVISION

20AS24



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SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.
Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.
Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.
Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

(INSULATION CHECK PROCEDURE)

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

[Note 1]

If you have not the 500V insulation resistance meter, use a Tester.

[Note 2]

External exposure metal: Antenna terminal
Earphone jack

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER
   The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

IMPORTANT

Inferior silicon grease can damage IC's and transistors.
When replacing an IC's or transistors, use only specified silicon grease (YG6260M).
Remove all old silicon before applying new silicon.

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GENERAL SPECIFICATIONS

G-1	**TV System**	CRT	CRT Size / Visual Size	19 inch / 480.0mmV
			CRT Type	Normal
			Deflection	90 degree
			Magnetic Field BV/BH	+0.35G/0.30G
		Color System		NTSC
		Speaker		1Speaker
			Position	Bottom
			Size	3 Inch
			Impedance	8 ohm
		Sound Output	MAX	1.5 W
			10%(Typical)	1.0 W
		NTSC3.58+4.43 /PAL60Hz		No
G-2	**Tuning System**	Broadcasting System		US System M
		Tuner and Receive CH	System	1Tuner
			Destination	USA(W/ CATV)
			Tuning System	F-Synth
			Input Impedance	VHF/UHF 75 ohm
			CH Coverage	2 - 69, 4A, A-5 - A-1, A - I, J - W, W+1 - W+84
		Intermediate Frequency	Picture(FP)	45.75MHz
			Sound(FS)	41.25MHz
			FP-FS	4.50MHz
		Preset CH		No
		Stereo/Dual TV Sound		No
		Tuner Sound Muting		Yes
G-3	**Power**	Power Source	AC	120V AC 60Hz
			DC	
		Power Consumption	at AC	
				73 W at AC 120 V 60 Hz
			Stand by (at AC)	5 W at AC 120 V 60 Hz
			Per Year	-- kWh/Year
		Protector	Power Fuse	Yes
G-4	**Regulation**		Safety	UL
			Radiation	FCC
			X-Radiation	DHHS
G-5	**Temperature**		Operation	+5oC ~ +40oC
			Storage	-20oC ~ +60oC
G-6	**Operating Humidity**			Less than 80% RH

GENERAL SPECIFICATIONS

G-7	**On Screen Display**	Menu			Yes
		Menu Type			Character
		Picture			Yes
			Contrast		Yes
			Brightness		Yes
			Color		Yes
			Tint		Yes
			Sharpness		Yes
		Audio			No
			Bass		No
			Treble		No
			Balance		No
			BBE On/Off		No
			Stable Sound On/Off		No
		CH Set Up			Yes
			TV/CABLE(CATV)		Yes
			Auto CH Memory		Yes
			Add/ Delete		Yes
		Language			Yes
		V-chip			Yes
		Lock			Yes
		On Timer			Yes
			CH Label		No
			Favorite CH		No
			Color Stream DVD/DTV		No
		Control Level			Yes
			Volume		Yes
			Brightness		Yes
			Contrast		Yes
			Color		Yes
			Tint		Yes
			Sharpness		Yes
			Tuning		No
			Bass		No
			Treble		No
			Balance		No
			Back Light		No
		Stereo,Audio Output,SAP			No
		Video			Yes
		Color Stream			No
		Channel(TV/Cable)			Yes
		CH Label			No
		Game Timer			Yes
		Sleep Timer			Yes
		Sound Mute			Yes
		V-chip Rating			Yes
G-8	**OSD Language**				English French Spanish
G-9	**Clock and Timer**	Sleep Timer	Max Time		120 Min
			Step		10 Min
		On Timer	Program(On Timer)		Yes
		Wake Up Timer			No
		Timer Back-up (at Power Off Mode)	more than		-- Min Sec

GENERAL SPECIFICATIONS

G-10	**Remote Control**	Unit		RC-EH
		Glow in Dark Remocon		Yes
		Format		Toshiba
		Custom Code		40-BF h
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		27 Keys
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0	Yes
			100	No
			CH Up	Yes
			CH Down	Yes
			Volume Up	Yes
			Volume Down	Yes
			TV/Caption/Text	Yes
			CH1/CH2	Yes
			TV/Video(TV/AV)	Yes
			CH RTN/CH ENT(Quick View)	Yes
			Sleep	Yes
			RE Call(Call)	Yes
			Reset	Yes
			Menu	Yes
			Enter	Yes
			Mute	Yes
			Exit	No
			MTS(Audio Select)	No
			Set +	Yes
			Set -	Yes
		Multi Brand Keys	CH Up(VCR)	No
			CH Down(VCR)	No
			Pause/Still	No
			TV/VCR(VCR)	No
			Code	No
			FF	No
			Rew	No
			Rec	No
			Play	No
			Stop	No
			TV	No
			VCR	No
			Cable	No

GENERAL SPECIFICATIONS

G-11	**Features**	Auto Degauss		Yes
		Auto Shut Off		Yes
		Canal+		No
		CATV		Yes
		Anti-theft		No
		Rental		No
		Memory(Last CH)		Yes
		Memory(Last Volume)		Yes
		V-Chip		Yes
			Type	USA,ORION Type
		BBE		No
		Auto Search		No
		CH Allocation		No
		SAP		No
		Just Clock Function		No
		CH Label		No
		VM Circuit		No
		Full OSD		No
		Premiere		No
		Comb Filter		No
				Lines
		Auto CH Memory		Yes
		Hotel Lock		No
		Closed Caption		Yes
		Stable Sound		No
		FBT Leak Test Protect		Yes
		CH Lock		Yes
		Video Lock		Yes
		Game Timer (Max Time:120 Min)		Yes
		Stable Sound		No
		Energy Star		No
		Power On Memory		Yes
		Favorite CH		No
G-12	**Accessories**	Owner's Manual	Language	English / Spanish
			W/ Warranty	No
		Remote Control Unit		Yes
		Rod Antenna		No
			Poles	
			Terminal	
		Loop Antenna		No
			Terminal	
		U/V Mixer		No
		DC Car Cord (Center+)		No
		Guarantee Card		Yes
		Warning Sheet		No
		Circuit Diagram		No
		Antenna Change Plug		No
		Service Facility List		No
		Important Safety Instruction		No
		Dew/AHC Caution Sheet		No
		AC Plug Adapter		No
		Quick Set-up Sheet		No
		Battery		Yes
			UM size x pcs	UM4 x 2
			OEM Brand	No
		AC Cord		No
		AV Cord (2Pin-1Pin)		No
		Registration Card (NDL Card)		No
		ESP Card		No
		PTB Sheet		No
		300 ohm to 75 ohm Antenna Adapter		No

GENERAL SPECIFICATIONS

G-13	**Interface**	Switch	Front	Power	Yes
				System Select	No
				Main Power SW	No
				Sub Power	No
				Channel Up/Reset	Yes
				Channel Down/Enter	Yes
				Volume Up/Set Up	Yes
				Volume Down/Set Down	Yes
				MENU=Volume Up+Volume Down	Yes
			Rear	AC/DC	No
				TV/CATV Selector	No
				Degauss	No
				Main Power SW	No
		Indicator		Power	Yes
				Stand-by	No
				On Timer	No
		Terminals	Front	Video Input	RCA
				Audio Input	RCA x 1
				Other Terminal	No
			Rear	Video Input(Rear1)	No
				Video Input(Rear2)	No
				Audio Input(Rear1)	No
				Audio Input(Rear2)	No
				Video Output	No
				Audio Output	No
				Euro Scart	No
				Color Stream	No
				Diversity	No
				Ext Speaker	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	F Type
				AC Outlet	No
G-14	**Set Size**			Approx. W x D x H (mm)	488 x 465 x 416
G-15	**Weight**			Net (Approx.)	17.5kg (38.6 lbs)
				Gross (Approx.)	20.0kg (44.1lbs)
G-16	**Carton**		Master Carton		No
				Content	---- Sets
				Material	-- /--
				Dimensions W x D x H(mm)	-- x -- x --
				Description of Origin	No
			Gift Box		Yes
				Material	Double/Brown
				Dimensions W x D x H(mm)	546 x 526 x 472
				Design	As per Buyer's
				Description of Origin	Yes
			Drop Test		Natural Dropping At 1 Corner / 2 Edges / 4 Surfaces
				Height (cm)	60 (ORION SPEC:46)
			Container Stuffing		436 Sets/40' container
G-17	**Cabinet Material**		Cabinet	Cabinet Front	PS 94V0 DECABROM
				Cabinet Rear	PS 94V0 DECABROM
			PCB	Non-Halogen Demand	No
				Eyelet Demand	Yes
G-18	**Environment**		Pb Free	Lead-free Solder	No
			Cd Free		No

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 1-1.)**
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.

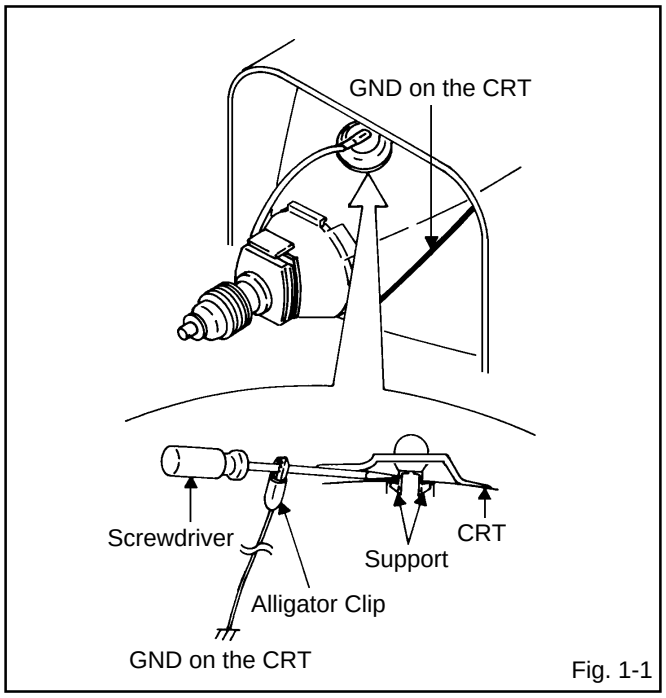


Fig. 1-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support. **(Refer to Fig. 1-2.)**

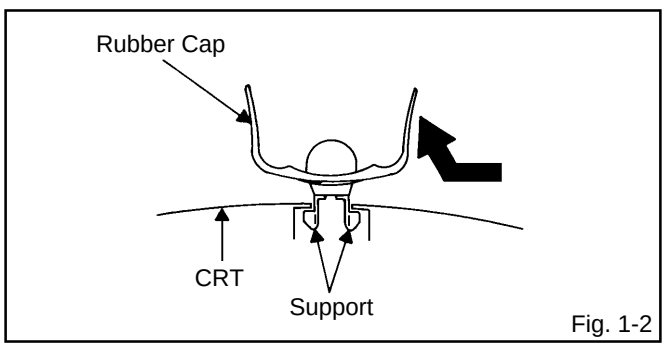


Fig. 1-2

3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 1-3.)**

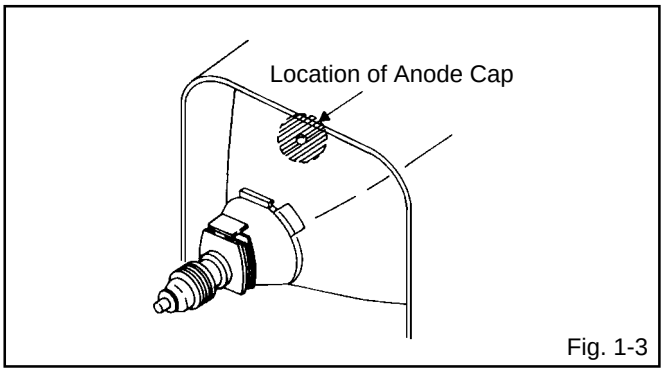


Fig. 1-3

NOTE

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. **(Refer to Fig. 1-4.)**

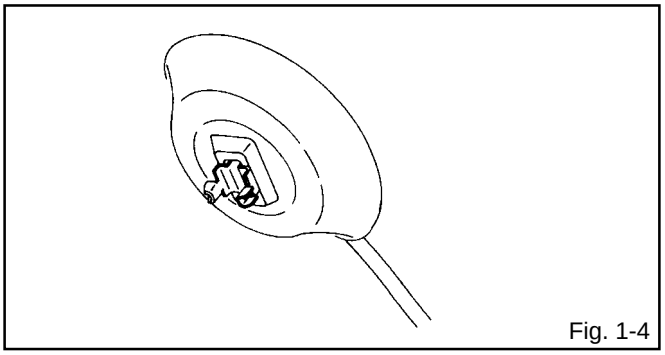


Fig. 1-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 1-5**.

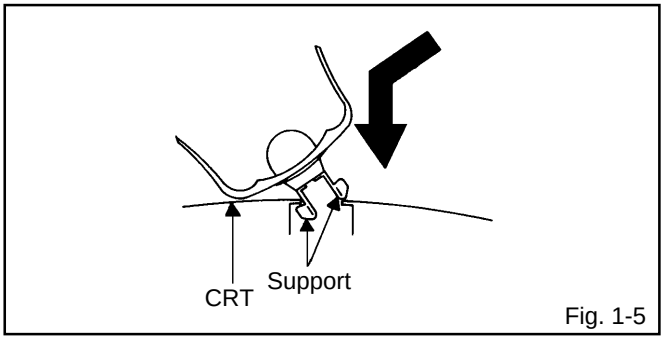


Fig. 1-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

DISASSEMBLY INSTRUCTIONS

2. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. **(Refer to Fig. 2-1.)**

   NOTE

   Masking is carried out on all the parts located within 10 mm distance from IC leads.

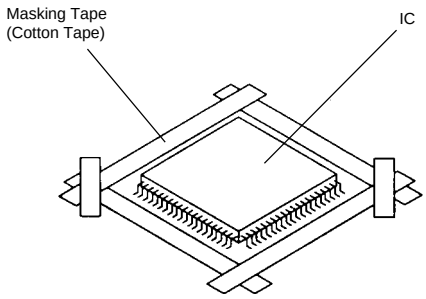


Fig. 2-1

2. Heat the IC leads using a blower type IC desoldering machine. **(Refer to Fig. 2-2.)**

   NOTE

   Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.

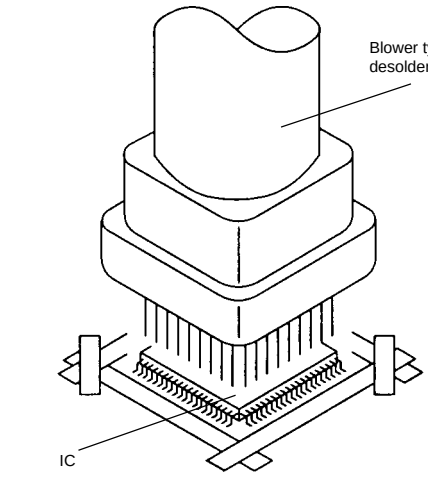


Fig. 2-2

3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. **(Refer to Fig. 2-3.)**

   NOTE

   Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

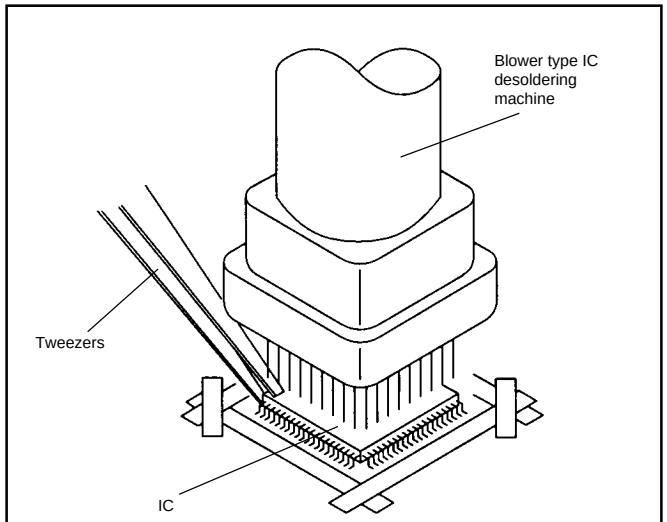


Fig. 2-3

4. Peel off the Masking Tape.

5. Absorb the solder left on the pattern using the Braided Shield Wire. **(Refer to Fig. 2-4.)**

   NOTE

   Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.

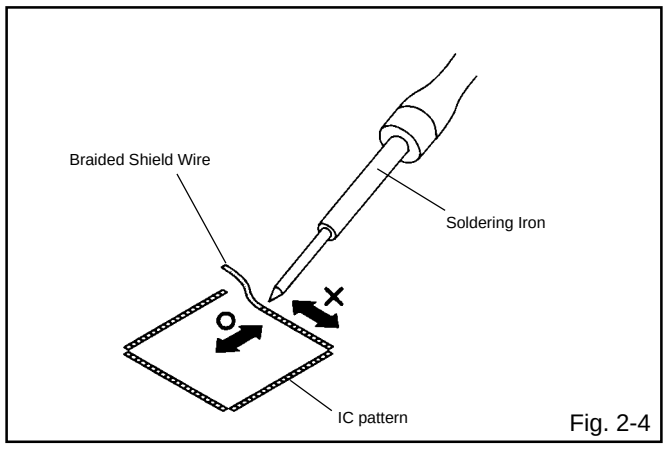


Fig. 2-4

DISASSEMBLY INSTRUCTIONS

INSTALLATION

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 2-5.)**

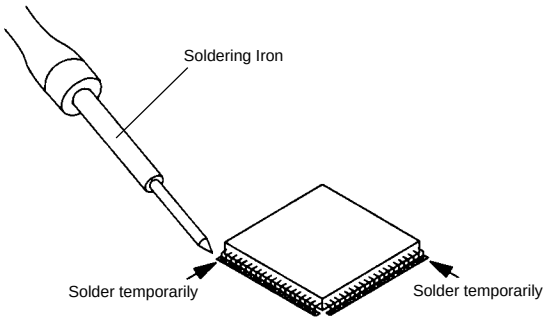


Fig. 2-5

2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 2-6.)**

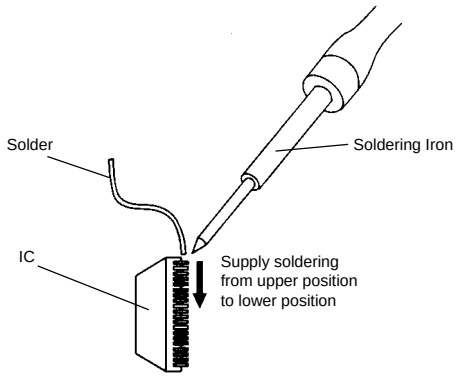


Fig. 2-6

3. Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 2-7.)**

   NOTE

   Do not absorb the solder to excess.

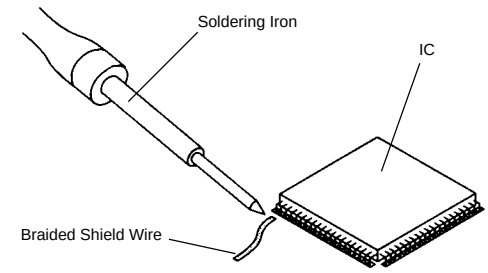


Fig. 2-7

4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 2-8.)**

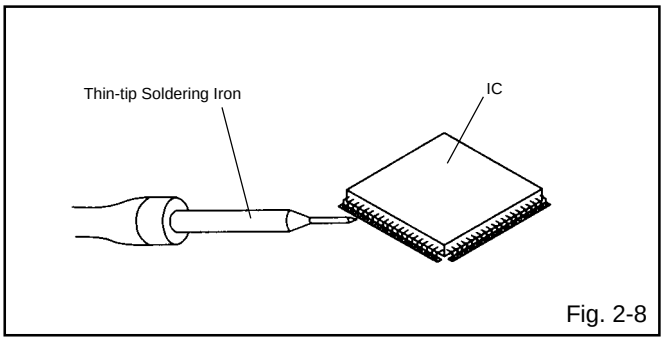


Fig. 2-8

5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass.
   Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

   NOTE

   When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, always be sure to replace the IC in this case.

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.
To enter the Service Mode, press both set key and remote control key for more than 1 second.

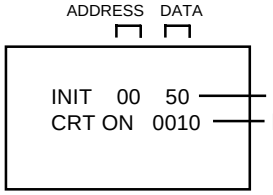
Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Releasing of V-CHIP PASSWORD.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing. If you set a factory initialization, the memories are reset such as the channel setting, and the POWER ON total hours.
VOL. (-) MIN	6	POWER ON total hours is displayed on the screen. Refer to the "CONFIRMATION OF HOURS USED". Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "WHEN REPLACING EEPROM (MEMORY) IC".
VOL. (-) MIN	8	Writing of EEPROM initial data. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).

CONFIRMATION OF HOURS USED

POWER ON total hours can be checked on the screen. Total hours are displayed in 16 system of notation.

NOTE: If you set a factory initialization, the total hours is reset to "0".

1. Set the VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second.
3. After the confirmation of using hours, turn off the power.



Initial setting content of MEMORY IC.
POWER ON total hours.
= (16 x 16 x 16 x thousands digit value)
+ (16 x 16 x hundreds digit value)
+ (16 x tens digit value)
+ (ones digit value)

FIG. 1

WHEN REPLACING EEPROM (MEMORY) IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

NOTE: No need setting for after INI 0F due to the adjustment value.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	50	04	EB	4E	57	B3	24	69	39	00	00	05	90	AE	00	07

Table 1

1. Enter DATA SET mode by setting VOLUME to minimum.
2. Press both VOL. DOWN button on the set and Channel button **(6)** on the remote control for more than 1 second. ADDRESS and DATA should appear as FIG 1.
3. ADDRESS is now selected and should "blink". Using the VOL. +/- button on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using VOL. +/- button until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input. **After the data input, set to the initializing of shipping.**
9. Turn POWER on.
10. Press both VOL. DOWN button on the set and Channel button **(1)** on the remote control for more than 1 second.
11. After the finishing of the initializing of shipping, the unit will turn off automatically.

The unit will now have the correct DATA for the new MEMORY IC.

ELECTRICAL ADJUSTMENTS

1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
- When you exchange IC and Transistor for a heat sink, apply the silicon grease on the contact section of the heat sink. Before applying new silicon grease, remove all the old silicon grease. (Old grease may cause damages to the IC and Transistor.)

Prepare the following measurement tools for electrical adjustments.

1. Oscilloscope
2. Digital Voltmeter
3. Pattern Generator

On-Screen Display Adjustment

1. In the condition of NO indication on the screen. Press the VOL. DOWN button on the set and the Channel button **(9)** on the remote control for more than 1 second to appear the adjustment mode on the screen as shown in **Fig. 1-1**.

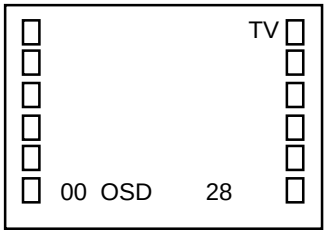


Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button **(0-9)** on the remote control to select the options shown in **Fig. 1-2**.
4. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION
00	OSD H	16	CONTRAST CENT
01	CUT OFF	17	CONTRAST MAX
04	H. VCO	18	CONTRAST MIN
05	H. PHASE	19	COLOR CENTER
06	V. SIZE	20	COLOR MAX
07	V. SHIFT	21	COLOR MIN
08	R DRIVE	22	TINT
09	B DRIVE	23	SHARPNESS
10	R BIAS	24	FM LEVEL
11	G BIAS	25	LEVEL
12	B BIAS	26	SEPARATION1
13	BRIGHT CENT	27	SEPARATION2
14	BRIGHT MAX	28	TEST MONO
15	BRIGHT MIN	29	TEST STEREO

Fig. 1-2

2. BASIC ADJUSTMENTS

2-1: CUT OFF

1. Adjust the unit to the following settings. R.DRIVE=10, B.DRIVE=10, R.BIAS=64, G.BIAS=64, B.BIAS=64, BRI.CENT=100, CONT.MAX=60.
2. Place the set with Aging Test for more than 15 minutes.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "CUT OFF".
4. Adjust the **Screen Volume** until a dim raster is obtained.

2-2: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 10 minutes.
2. Receive the gray scale pattern from the Pattern Generator.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(10)** on the remote control to select “R. BIAS”.
5. Press the CH. UP/DOWN button on the remote control to select the “R. BIAS”, “G. BIAS”, “B. BIAS”, “R. DRIVE” or “B. DRIVE”.
6. Adjust the VOL. UP/DOWN button on the remote control to whiten the R. BIAS, G. BIAS, B. BIAS, R. DRIVE, and B. DRIVE at each step tone sections equally.
7. Perform the above adjustments 5 and 6 until the white color is looked like a white.

2-3: FOCUS

1. Receive the monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-4: HORIZONTAL PHASE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(05)** on the remote control to select “H. PHAS”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-5: VERTICAL SHIFT

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(07)** on the remote control to select “V. SFT”.
4. Press the VOL. UP/DOWN button on the remote control until the horizontal line becomes fit to the notch of the shadow mask.

ELECTRICAL ADJUSTMENTS

2-6: VERTICAL SIZE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(06)** on the remote control to select “V. SIZE”.
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on upside and downside becomes 10 ± 2%.

2-7: SUB BRIGHTNESS

1. Receive the monoscope pattern. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "BRI.CENT".
4. Press the VOL. UP/DOWN button on the remote control until the white 15% is starting to be visible
5. Receive the monoscope pattern. (Audio Video Input)
6. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.

2-8: SUB TINT/SUB COLOR

1. Receive the color bar pattern.
2. Connect the oscilloscope to **TP023**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(22)** on the remote control to select "TINT".
4. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes as straight line **(Refer to Fig. 2-1)**
5. Connect the oscilloscope to **TP022**.
6. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(19)** on the remote control to select "COL.CENT".
7. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to 110 ± 10% of the white level. **(Refer to Fig. 2-2)**
8. Receive the color bar pattern. (Audio Video Input)
9. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 2~7

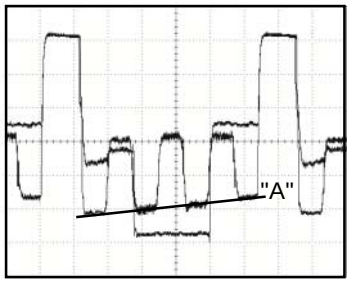


Fig. 2-1

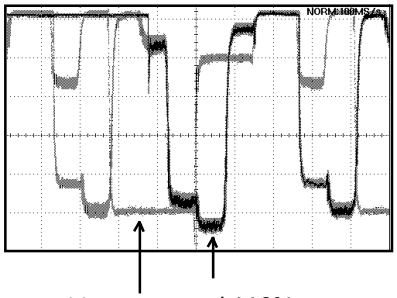


Fig. 2-2

2-9: SUB CONTRAST

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(17)** on the remote control to select “CONT. MAX”.
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes “60”.
3. Receive a broadcast and check if the picture is normal.
4. Press the TV/VIDEO button on the remote control to set to the AV mode. Then perform the above adjustments 1~3.

2-10: OSD HORIZONTAL

1. Activate the adjustment mode display of **Fig. 1-1**.
2. Press the VOL. UP/DOWN button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-3)**

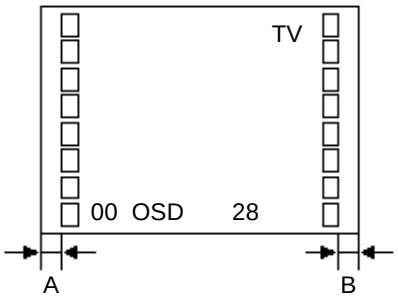


Fig. 2-3

2-11: Confirmation of Fixed Value (Step No.)

Please check if the fixed values of the each adjustment items are set correctly referring below. (RF/AV)

NO.	FUNCTION	STEP NO.
04	H. VCO	04
14	BRIGHT MAX	183
15	BRIGHT MIN	60
16	CONTRAST CENT	30
18	CONTRAST MIN	17
20	COLOR MAX	74
21	COLOR MIN	00
23	SHARPNESS	45
24	FM LEVEL	00
25	LEVEL	00
26	SEPARATION1	00
27	SEPARATION2	00

ELECTRICAL ADJUSTMENTS

3. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

3-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 3-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

3-2: PURITY

NOTE

Adjust after performing adjustments in section 3-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue color.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

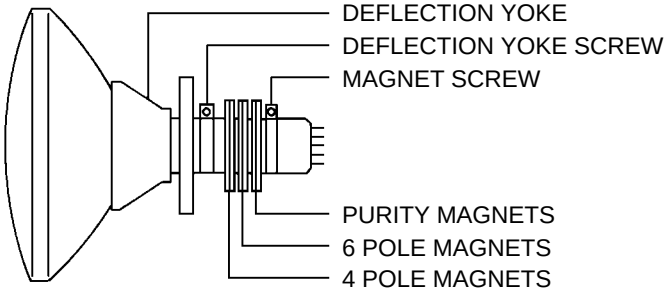


Fig. 3-1

3-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-2.

1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

3-4: DYNAMIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 3-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left. **(Refer to Fig. 3-2-a)**
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke. **(Refer to Fig. 3-2-b)**

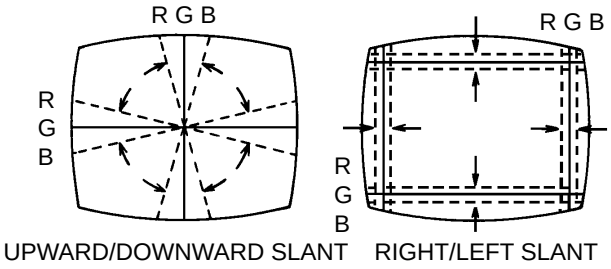
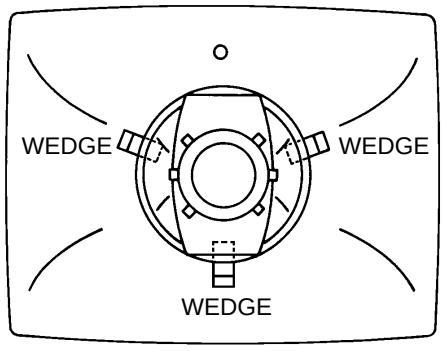


Fig. 3-2-a

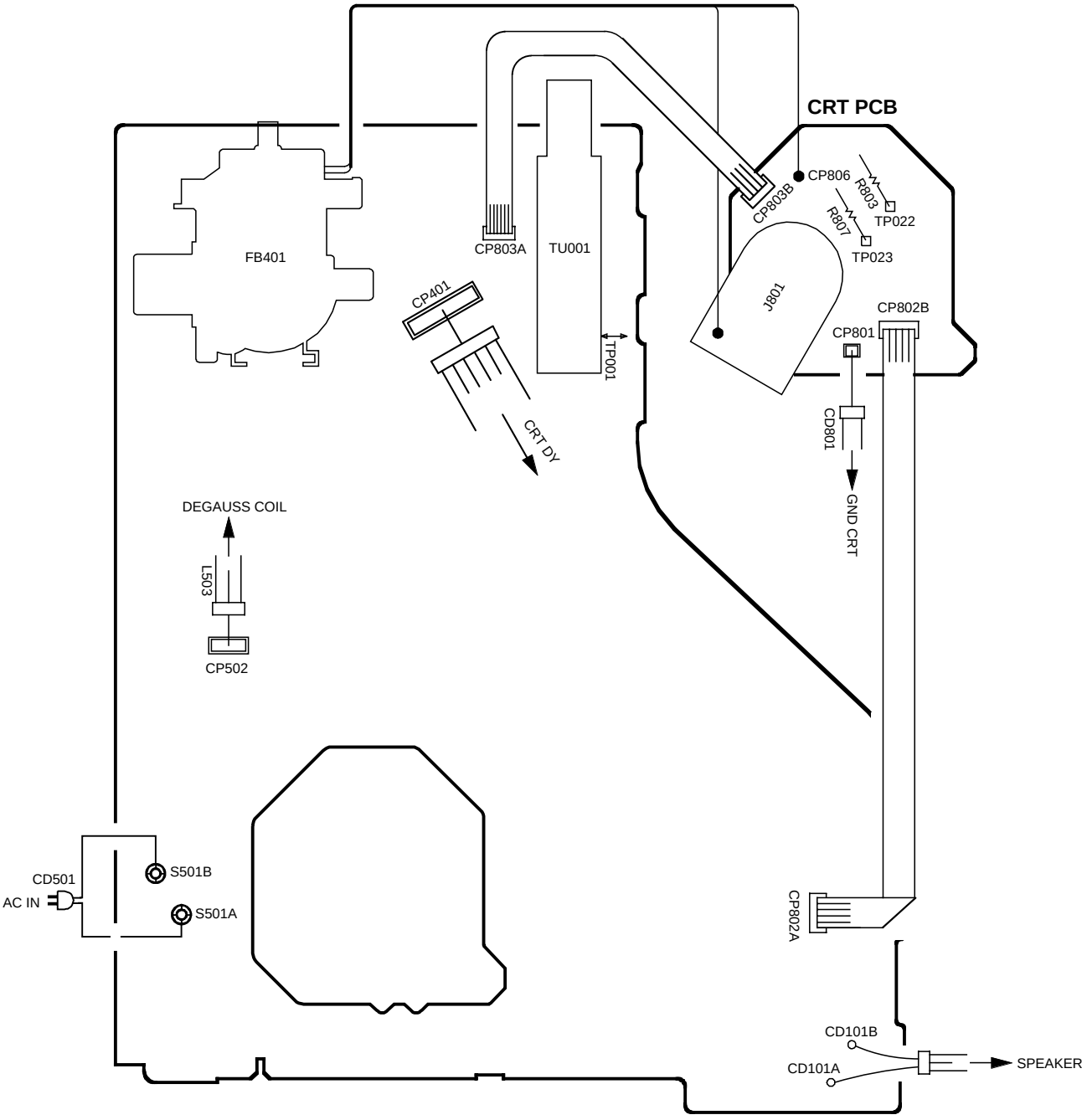


WEDGE POSITION

Fig. 3-2-b

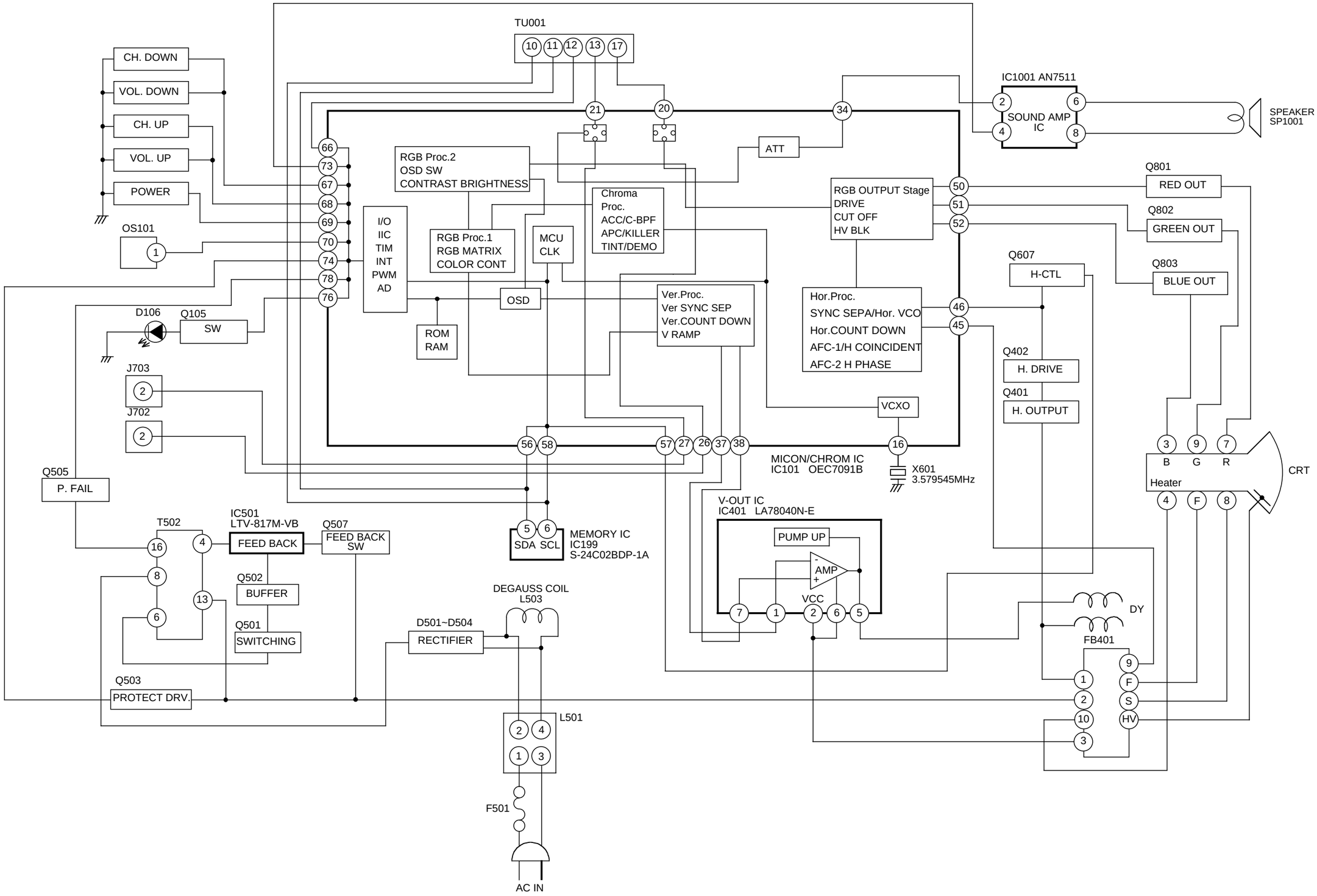
ELECTRICAL ADJUSTMENTS

4. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (WIRING CONNECTION)

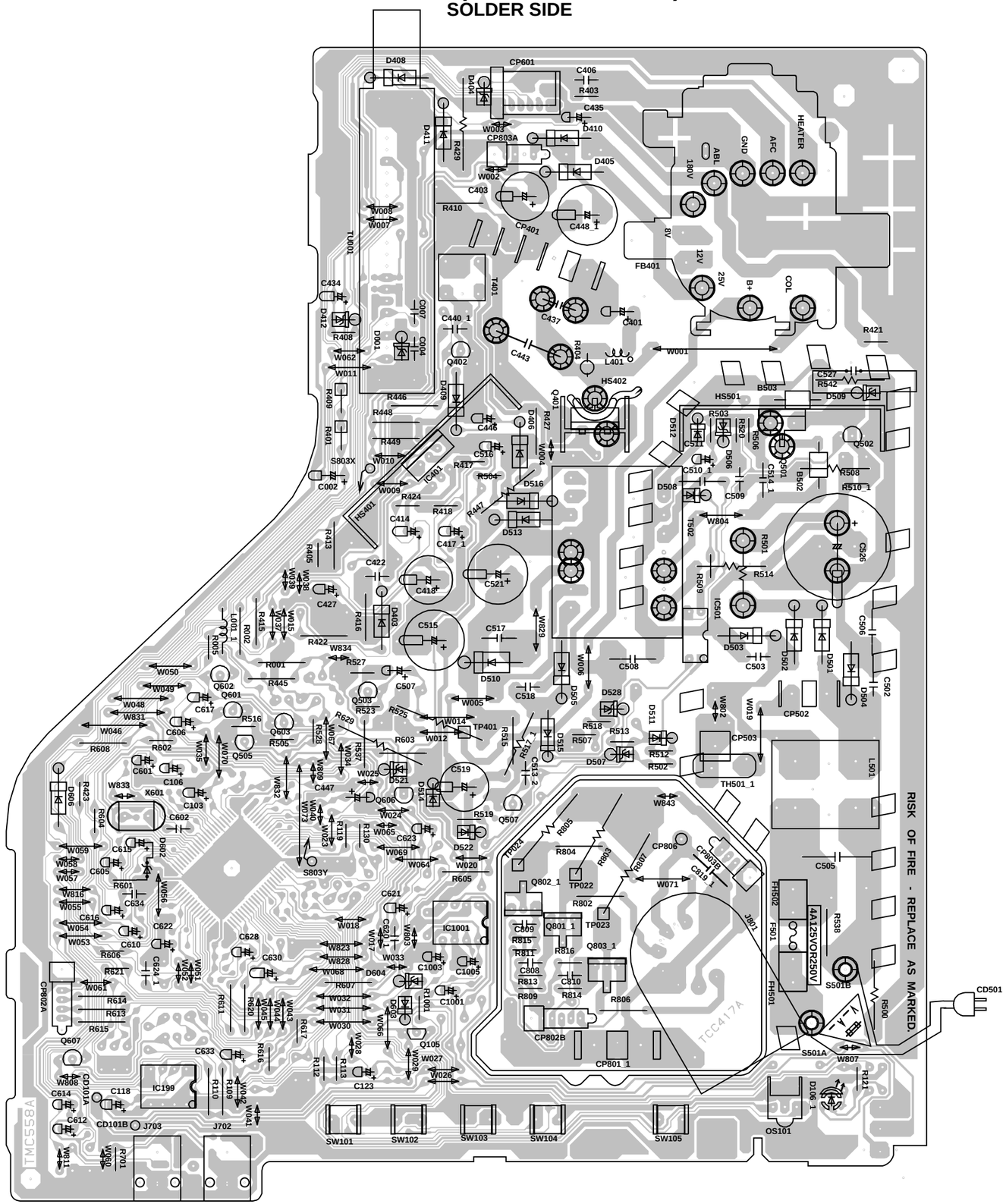


MAIN PCB

BLOCK DIAGRAM



PRINTED CIRCUIT BOARDS
MAIN/CRT (INSERTED PARTS)
SOLDER SIDE


TMC558A
TCC417A
RISK OF FIRE - REPLACE AS MARKED.
4A125VOR250V
D408
CP601
C406
R403
C435
D410
W003
CP803A
D405
W002
C403
R410
W008
W007
TU001
CP401
C448_1
FB401
180V
ABL
GND
AFC
HEATER
8V
12V
25V
B+
COL
C434
D412
R408
W062
W011
C007
C004
D001
Q402
T401
C440_1
C437
C443
C401
R401
L401
W001
R421
HS402
HS501
B503
C527
R542
D509
R446
R448
R449
W010
S803X
C002
W009
C401
R417
C516
C446
D406
R427
W004
Q401
D409
R503
R520
R506
D512
C511
D506
Q502
C510_1
C514_1
B502
R508
R510_1
D508
C509
W804
TS02
R501
R514
R509
IC501
D503
C503
D502
D501
D504
C506
C502
C526
ZZ
R424
R418
R447
C414
C417_1
D513
HS401
D516
R504
R405
R413
W039
W038
C422
C418
C521
C427
D403
R416
C515
C517
W820
R415
R002
L001_1
R405
R422
W834
R001
R527
R445
C507
D510
W006
D505
C508
C518
W050
W049
W048
W831
W046
R608
Q602
Q601
C617
R516
C606
Q503
R523
R525
R629
W005
D528
W802
W019
CP502
W014
TP401
R515
R517_1
C512_2
D511
R518
R513
R507
R512
R502
D507
CP503
TH501_1
L501
R603
W012
W057
W034
R537
W035
W070
Q505
R505
R602
C601
C106
W833
X601
C103
C602
R423
D606
R604
W059
W058
W057
C615
C605
D802
R601
W816
W055
C634
C616
W054
W053
C610
R606
C622
C824_1
W061
R614
R613
R615
Q607
CP802A
W809
CD101A
C614
C612
C118
CD101B
J703
J702
IC199
R110
R109
W042
W041
W811
W810
R701
W043
W044
W045
R620
R611
R617
R616
C633
W033
C1003
C1005
D604
W032
W031
W030
W066
W028
Q105
W029
W027
W026
C123
R112
R113
R1001
C1001
D602
C628
C630
W823
W828
W068
R607
W018
W027
C621
C620_1
W803
IC1001
W824
W825
W826
W827
W043
W044
W045
W047
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W931
W932
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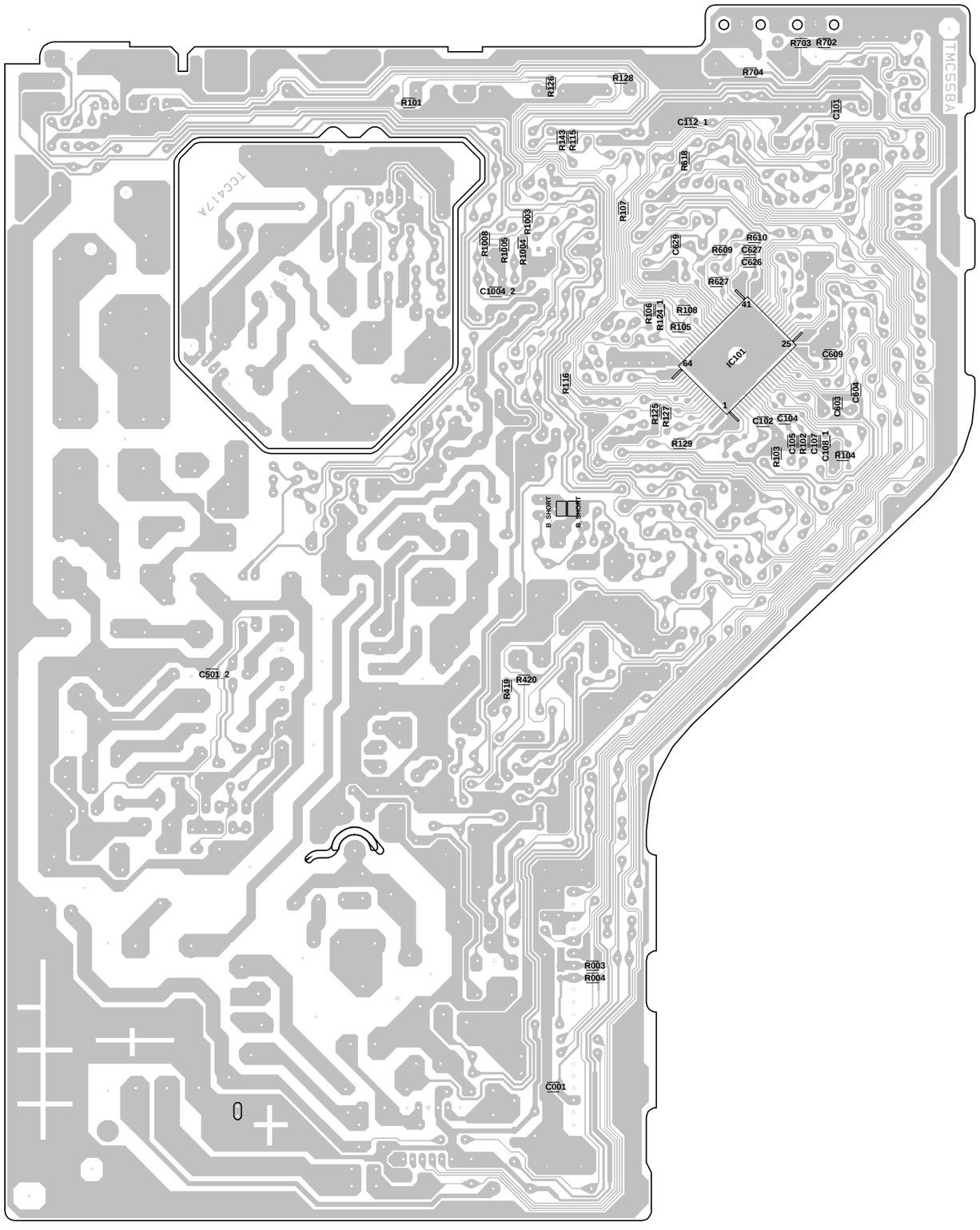
W937
W938
W939
W940

PRINTED CIRCUIT BOARDS
MAIN (CHIP MOUNTED PARTS)
SOLDER SIDE



MICON/CHROMA/TUNER SCHEMATIC DIAGRAM
(MAIN PCB)

1	CNVSS	41	NC
2	XIN	42	HVCO F/B
3	XOUT	43	AFC FILTER
4	TEST1	44	DEF GND
5	VSS	45	FBP IN
6	MCU VCC	46	H OUT
7	TEST0	47	DEF VCC
8	FILT	48	NC
9	HLT	49	HI VCC
10	VHOLD	50	R OUT
11	CVIN	51	G OUT
12	RESET IN	52	B OUT
13	MCU RESET OUT	53	ACL
14	Y SW OUT	54	NC
15	V/C GND	55	PROTECT
16	3.58 XTAL	56	SDA
17	C-APC	57	H_CTL
18	MCU5.7V REG OUT	58	SCL
19	NC	59	NC
20	CVBS IN3	60	NC
21	AUDIO IN3	61	NC
22	V/C VCC	62	DEGAUSS_H
23	MCU TEST	63	STANDBY_H
24	CVBS IN2	64	VOLUME
25	AUDIO IN2	65	NC
26	CVBS IN1	66	AFT
27	AUDIO IN1	67	KEY1
28	5.7V REG OUT	68	KEY2
29	C(Y/C) IN	69	POWER_ON
30	Y(Y/C) IN	70	REMOCON
31	VREG VCC	71	AV2
32	FSC OUT	72	AV1
33	MONITOR OUT	73	AUDIO_MUTE
34	AUDIO ATT OUT	74	X-RAY
35	AUDIO ATT FILTER	75	IIC_OFF
36	TEST 3	76	ON_TIMER
37	V RAMP F/B	77	SYNC
38	V RAMP OUT	78	POWER FAIL
39	V RAMP CAP	79	NC
40	8.7V REG OUT	80	EXT_MUTE

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

ATTENTION:LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

CAUTION: DIGITAL TRANSISTOR

◀ R.SIGNAL
◀ G.SIGNAL
≪ B.SIGNAL

⇦ AUDIO SIGNAL
⇦ DEFLECTION SIGNAL
⇦ TUNER VIDEO SIGNAL

FROM/TO DEFLECTION/CRT
FROM/TO TV POWER
FROM/TO SOUND/AV
TEST POINT

PCB010
TMC558

TV POWER SCHEMATIC DIAGRAM
(MAIN PCB)

CAUTION :FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE 4A 125V (F501) FUSE.

ATTENTION :POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE 4A 125V (F501).

4A 125V

TO SOUND/AV

GND
SOUND+B
SOUND_GND

FROM/TO DEFLECTION/CRT

+B
UNREG+12V
P.CON+B

FROM/TO MICON/CHROMA/TUNER

POWER_FAIL
X-RAY
UNREG+12V
AT+5V
GND

DEGAUSS COIL
L503
8R200030

CP502
A1561WV2-2P

W802

R600
2.7M 1/2W +10%

CP503
003P-2100

TH501_1
B59203-S1060-B14

F501
51MS040L
4A125V

FH501
EYF-52BCY

FH502
EYF-52BCY

C505
275V 0.22 ECQUL

R658
1.5M 1/2W

COIL,LINE FILTER
L501
1R0A562F20

D501 1N4005-EIC
D502 1N4005-EIC
D503 1N4005-EIC
D504 1N4005-EIC

C502
500V 0.001 B

C503
500V 0.001 B

R501
3.3 5W

R514
0.22 1W

C526
200V 330 UP

R510_1
2.2M 1/2W

D509 MTZJ18B

C527
0.0056 B

T502
8129109S

AC120V_60Hz
CD501
0R414903

BLACK
WHITE
BLADE WIDE

S501A
S501B

C506
250V 0.001 KX

C514_1
2KV 680P RR

W804

B502
W5RH3.5X5X1.0

144.0

G 4.8
S
0.1

POWER AMP
Q501
STP5NC50FP

R508
220 1W

C509
0.047 M

D508 1SS133

R520
56K 1/4W

R509
100 1/4W

B503
W5RH3.5X5X1.0

R542
0.47 1W

BUFFER
Q502
KTC3198
4.8
0.1
0

R506
1K 1/4W

HS501
763WSAA013

C501_2
0.0082 B

C508
250V 0.0047 KX

C510_1
0.033 B

D512 1SS133

R503
100 1/4W

C511
50V 1 KA

D506 MTZJ18B

FEED BACK
IC501
LTV-817M-VB

0.1

11.5
10.5
9.5

R512
680 1/4W

D515 1SS133

D507 MTZJ2.2B

R502
100 1/4W

D511 1SS133

R513
2.2K 1/4W

D528 MTZJ5.6B

C513_2
0.1 F

9.5
6.0
5.5

FEED BACK
SWITCHING
Q507
KTC3198

R519
1.2K 1/4W

R515
120K 1/2W

D514 1SS133

D522 1SS133

R507
100 1/4W

R518
5.6K +-1%

D505
21DQ09N

C518
500V470P B

R517_1
3.3 1W

C519
16V 1000 YK

D510
RU2AM-EIC

C517
2KV 820P RR

C521
160V 100 MHE

PROTECT DRIVE
Q503
2SA1624
135.0
0
135.0

C507
100V 10 MHE

R523
47K

R527
5.6K

R525
1.2 2W

R528
6.8K 1/4W

W834

W832

R537
10K 1/4W

D516
1N4937

R504
100 1/4W

D521
MTZJ6.8B

R505
1K 1/4W

4.9
0
4.8

P.FAIL
Q505
KTA1266

R516
10K 1/4W

C516
50V 10 YK

D513
21DQ09N

C515
16V 2200 YK

W829

1.7
144.0
10.3
6.6
10.3
10.0
132.3
11.3

PCB010
TMC558

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

NOTE:THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THE RESISTOR MARKED F IS FUSE RESISTOR. THE ALUMI ELECTROLYTIC CAPACITOR MARKED NP IS NON POLAR ONE.

ATTENTION:LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY,USE ONES DESCRIBED IN PARTS LIST ONLY 。

DEFLECTION/CRT SCHEMATIC DIAGRAM (MAIN PCB)

FROM MICON/CHROMA/TUNER

CLAMP
G.OUT
R.OUT
B.OUT

CP802A B2013H02-5P
CD802 2EDA3001
CP802B B2013H02-5P
CP803A B2013H02-4P
CD803 2EDA3001
CP803B B2013H02-4P

V-OUT IC IC401 LA78040N-E

THERMAL PROTECTION
PUMP UP
AMP

R423 100 1/4W
R424 6.8K 1/4W
D403 11E1-EIC
R417 15K 1/4W
R418 33K 1/4W
R419 680
R420 4.7K
C418 25V 470 YK
C417_1 50V 10 YK
C422 100V 0.15 MKT
R410 330 1/2W
R415 1.8K 1/2W
R416 1 1/2W
R422 1.8 1/2W
R413 2.2K 1/2W
C427 50V 10 YK

HS401 763WSAA013

TO DY
CP401 A1561WV2-A5P

CD801 CU823001
CP801_1 A2361WV2-2P
W843
V801 A48LGS30X19N35

R809 4.7K 1/4W
R811 4.7K 1/4W
R814 4.7K 1/4W
RED OUT Q801_1 KTC4217
GREEN OUT Q802_1 KTC4217
BLUE OUT Q803_1 KTC4217
C808 390P B
R813 330 1/4W
C809 390P B
R815 330 1/4W
C810 390P B
R816 330 1/4W

TP022
TP024
TP023
R803 12K 2W
R802 2.7K 1/4W
R805 12K 2W
R804 2.7K 1/4W
R807 12K 2W
R806 2.7K 1/4W

FROM/TO MICON//CHROMA/TUNER

X-RAY
P.CON+B

C447 10V 470 YK
D412 MTZJ5.1B
R408 4.7K +-1%
C434 100V 22 YK
R429 3.9 1W
D411 AU02A-EIC
W831
R401 27K +-1%
R409 27K +-1%

C437 250V 0.33 PMS
C401 250V 2.2 MHE
L401 4.7mH
R404 68 1/2W

T401 ETH09K14BZ

GND
V_FEEDBACK
V_OUT
ABCL
H_OUT
H_SYNC

H.DRIVE Q402 2SC1627_Y
R446 470 1/2W
R405 1K 1/4W
C440_1 500V 0.0012 B
C446 50V 22 YK
R427 100 1/4W
H.OUTPUT Q401 TT2140LS-YBC11
C443 1.25KV 0.0066 MPP
HS402 763WSAA017

FB401 FQI20B103_M

FROM/TO TV POWER

GND

TP401
B_SHORT
+B

R403 22K 1/4W
C406 500V 100P B

P.CON+B

D404 MTZJ6.2B
D405 AU02A-EIC
D410 AU02A-EIC

R447 150 2W
D406 11E1-EIC
UNREG+12V

D409 11E1-EIC

R449 680 1/2W
R448 680 1/2W

R445 150K 1/4W
C403 35V 470 YK
C448_1 250V 22 YK
C435 100V 0.1 MHE
R421 220K 1/4W
D408 11E1-EIC

FOCUS
SCREEN
CP806
C819_1 2KV 0.001 B

PCB110 TCC417
PCB010 TMC558

J801 ISMS01S

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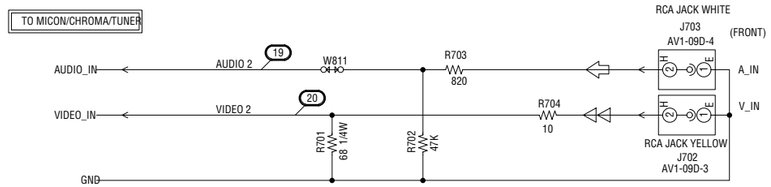
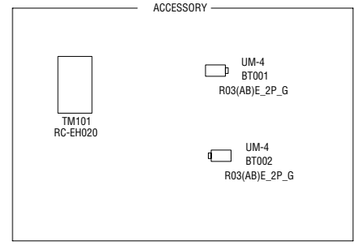
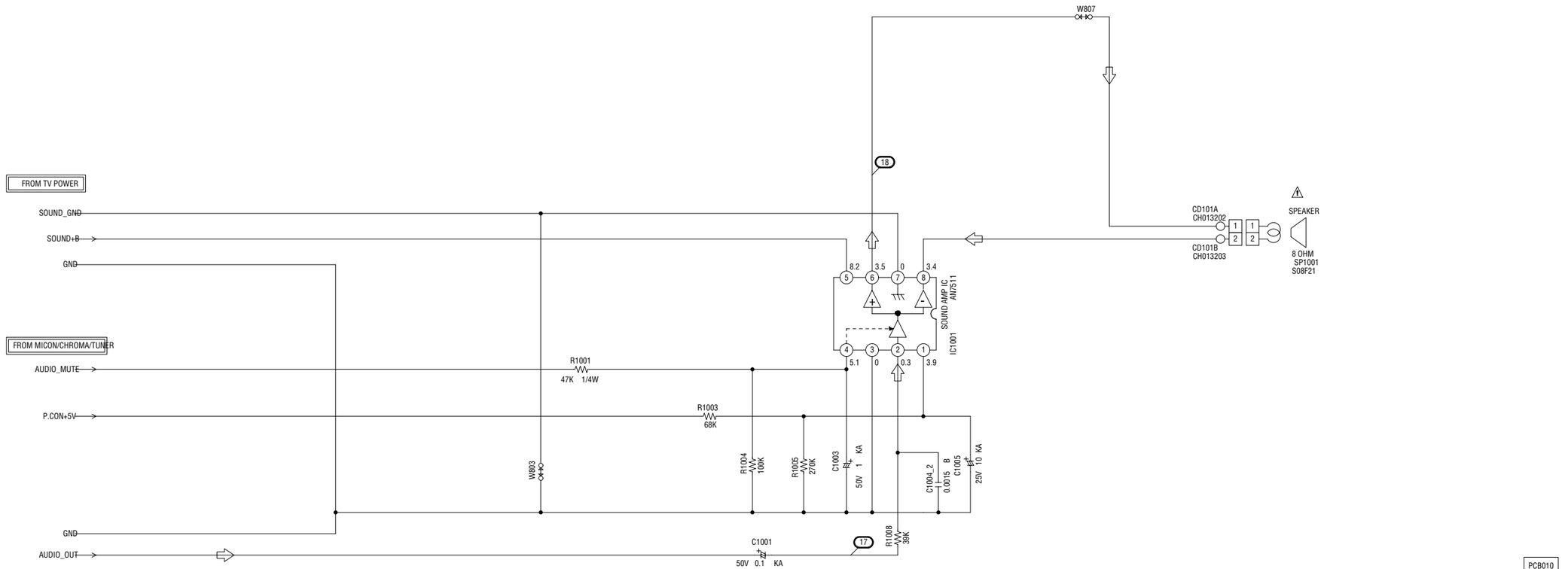
◀ R.SIGNAL
◀ G.SIGNAL
≪ B.SIGNAL
◀ DEFLECTION SIGNAL

SOUND/AV SCHEMATIC DIAGRAM

(MAIN PCB)







PCB010
TMC558

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

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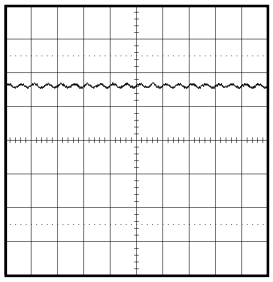
◁◁ TUNER VIDEO SIGNAL

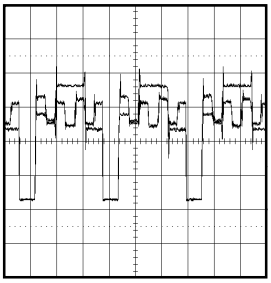
⇦ AUDIO SIGNAL

WAVEFORMS

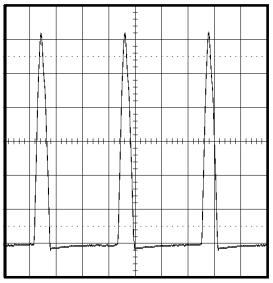
MICON/CHROMA/TUNER



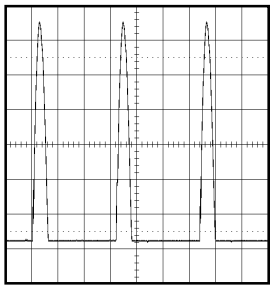
① 0.5V 2ms/div



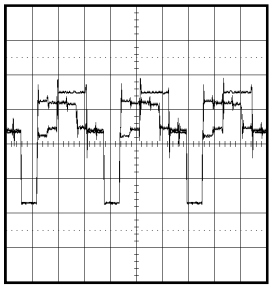
⑥ 1V 20µs/div



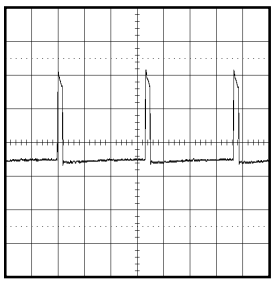
⑪ 200V 20µs/div



② 20V 20µs/div

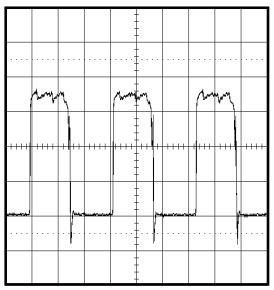


⑦ 1V 20µs/div

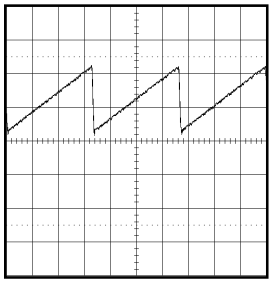


⑫ 10V 5ms/div

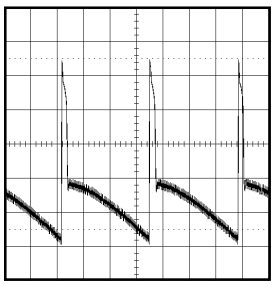
DEFLECTION/CRT



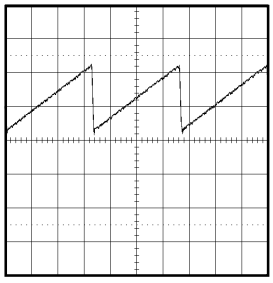
③ 200mV 20µs/div



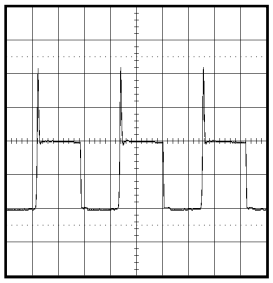
⑧ 0.5V 5ms/div



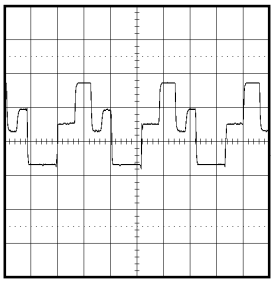
⑬ 10V 5ms/div



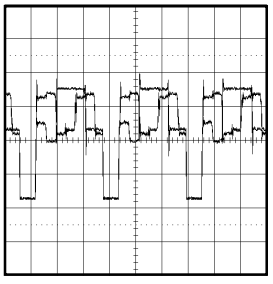
④ 0.5V 5ms/div



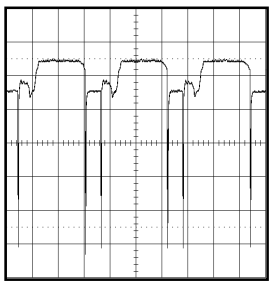
⑨ 20V 20µs/div



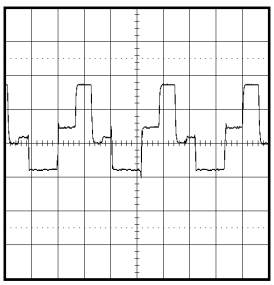
⑭ 50V 20µs/div



⑤ 1V 20µs/div



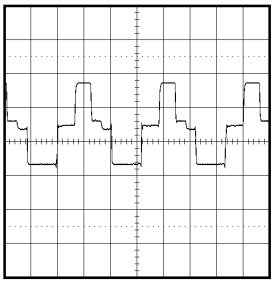
⑩ 2V 20µs/div



⑮ 50V 20µs/div

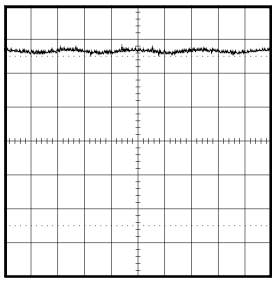
NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

WAVEFORMS

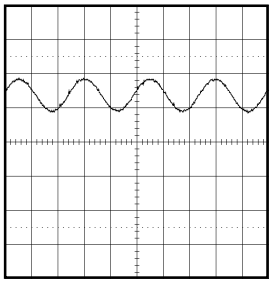


⑯ 50V 20µs/div

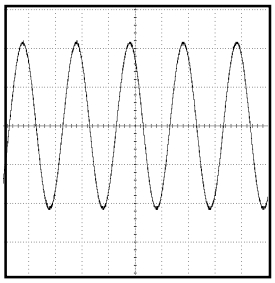
SOUND/AV



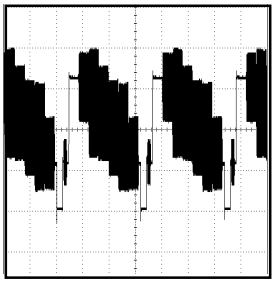
⑰ 0.5V 1ms/div



⑱ 1V 1ms/div



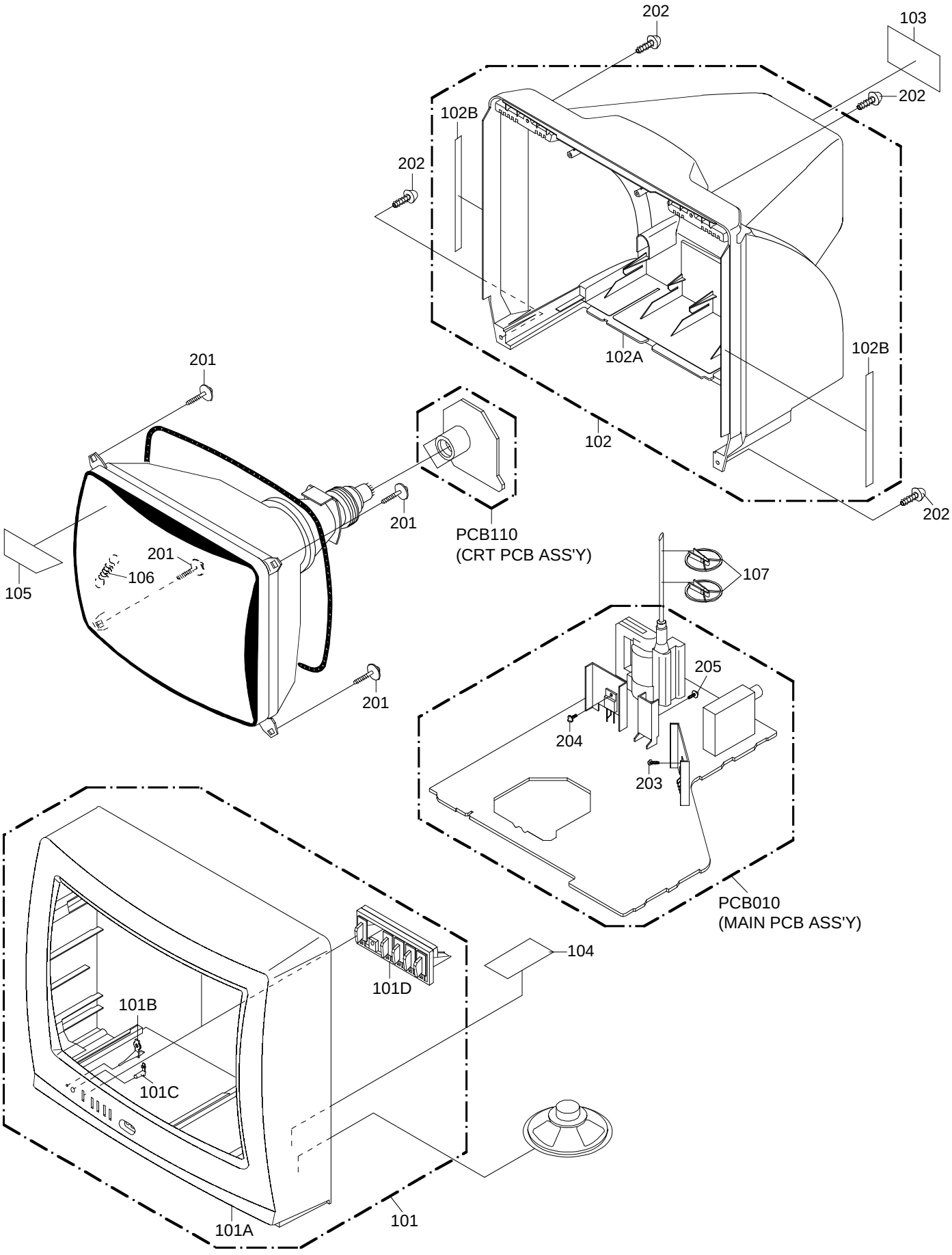
⑲ 200mV 500µs/div



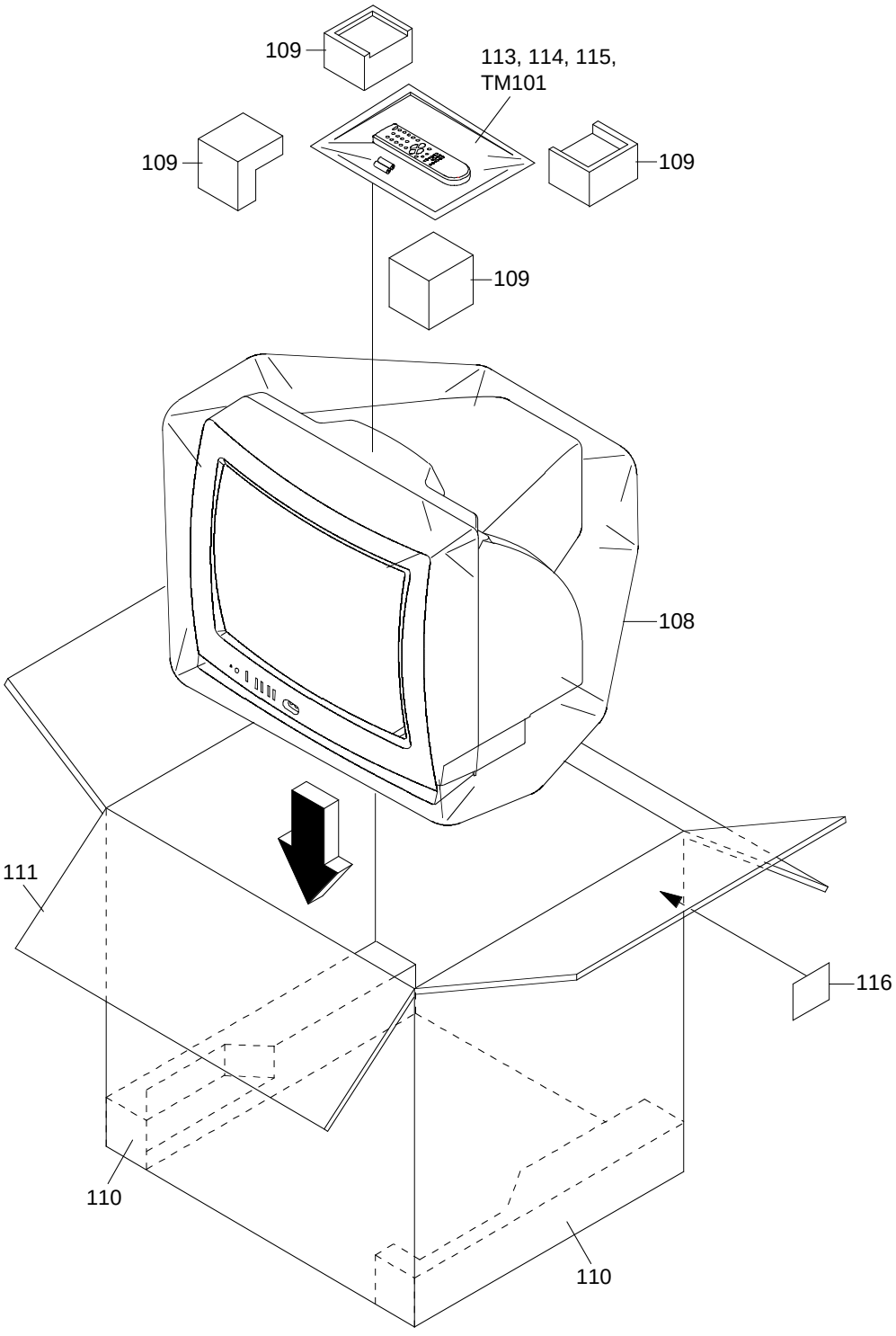
⑳ 500mV 20µs/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

MECHANICAL EXPLODED VIEW



MECHANICAL EXPLODED VIEW
(PACKING DIAGRAM)



MECHANICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
101	AE003261	A3M217J720	CABINET,FRONT ASSY	
101A	AE001499	701WPJC339	CABINET,FRONT	
101B	AE001500	713WPAA046	GLASS,LED	
101C	AD300694	713WPAA050	GUIDE,REMOCON	
101D	AE001501	735WPBA807	BUTTON,FRAME	
102	AE003262	A3M217J740	CABINET,BACK ASSY	
102A	AE003263	702WPAA593	CABINET,BACK	
102B	AE001694	800WQ0A014	FELT SHEET	
103	AE003264	722549A341	SHEET,RATING	
104	AD300007	7230006755	SHEET,CAUTION	
105	AE001693	723000C044	FILM,DECORATION	
106	AD300759	741WUA0021	SPRING,EARTH	
107	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
108	AD302402	791WHA0061	LAMIFILM BAG	
109	AD300700	792WHAA054	PACKAGE,TOP	
110	AD300701	792WHAA055	PACKAGE,BOTTOM	
111	AE003266	793WCDC175	GIFT BOX	
112	AE003267	A3M217J975	INSTRUCTION BOOK KIT	
113	AD302406	JB5UD200	POLYBAG,INSTRUCTION(RED CAUTION)	
114	AE003268	J3J91102D	GUARANTEE CARD	
115	AE003269	J3M21701A	INSTRUCTION BOOK	
116	AE004079	723000C584	SHEET,BAR CODE	
201	BZ710321	8121F50B84	SCREW,TAP TITE(P) FAI20 FLAT	5x28
202	BZ710035	8117540A64	SCREW,TAPPING(B0) TRUSS	4x16
203	BZ710018	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
204	BZ710352	8109I30604	SCREW,TAP TITE(B) WH7	3x6
205	BZ710562	8109I30804	SCREW,TAP TITE(B) WH7	3x8

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
		RESISTORS		
⚠R401	BZ210089	R4X5T6273F	R,METAL	27K OHM 1/6W
⚠R404	AE001556	R615U2680J	R,FUSE	68 OHM 1/2W
⚠R408	AD301014	R4X5T6472F	R,METAL	4.7K OHM 1/6W
⚠R409	BZ210089	R4X5T6273F	R,METAL	27K OHM 1/6W
⚠R429	BZ210242	R635813R9J	R,FUSE	3.9 OHM 1W
⚠R447	BZ210229	R3X28A151J	R,METAL OXIDE	150 OHM 2W
⚠R500	BZ210080	R0G3K2275K	RC	2.7M OHM 1/2W
⚠R501	AD301632	R5Y2CD3R3J	R,CEMENT	3.3 OHM 5W
⚠R508	AD300783	R3X181221J	R,METAL OXIDE	220 OHM 1W
⚠R509	AD301203	R002T4101J	RC	100 OHM 1/4W
R510	AE003279	R00202225J	RC	2.2M OHM 1/2W
⚠R514	BZ210190	R63581R22J	R,FUSE	0.22 OHM 1W
⚠R515	BZ210081	R002T2124J	RC	120K OHM 1/2W
⚠R517	AE001696	R3X1813R3J	R,METAL OXIDE	3.3 OHM 1W
⚠R518	AD300036	R4X5T6562F	R,METAL	5.6K OHM 1/6W
⚠R519	BZ210124	R002T4122J	RC	1.2K OHM 1/4W
⚠R525	AD301315	R3X18A1R2J	R,METAL OXIDE	1.2 OHM 2W
⚠R538	BZ210206	R002T2155J	RC	1.5M OHM 1/2W
⚠R542	AD300659	R3X181R47J	R,METAL OXIDE	0.47 OHM 1W
⚠R629	AE000081	R3X28B220J	R.METAL	B 22 OHM 3W
⚠R803	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
⚠R805	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
⚠R807	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
		CAPACITORS		
⚠C403	BZ110149	E02LT4471M	CE	470 UF 35V
⚠C414	AD301434	E02LU4101M	CE	100 UF 35V
⚠C418	BZ110041	E02LT3471M	CE	470 UF 25V
⚠C434	BZ110195	E02LU8220M	CE	22 UF 100V
C437	AD300663	P4J7F3334J	CMPP	0.33 UF 250V PMS
⚠C443	AE001548	P4N8FJ662H	CMPP	0.0066UF 1.25KV
⚠C446	BZ110205	E02LU5220M	CE	22 UF 50V
⚠C448	BZ110204	E0ELFD220M	CE	22 UF 250V
⚠C503	BZ110061	C0JTB0513K	CC	0.001 UF 500V B
⚠C505	BZ110025	P2122B224M	CMP	0.22 UF 275V ECQUL
⚠C506	AD301026	CD39E0M13M	CC	0.001 UF 250V
⚠C508	AE002878	CD39E0MQ3M	CC	0.0047UF 250V
C514	AD301320	C0PLRR7U2K	CC	680 PF 2KV R
⚠C515	BZ110135	E02L02222M	CE	2200 UF 16V
C517	BZ110203	C0PLRR7W2K	CC	820 PF 2KV RR
⚠C519	AD300925	E02LT2102M	CE	1000 UF 16V
C521	BZ110092	E5EZFB101M	CE	100 UF 160V
⚠C526	AD301635	E51CGC331M	CE	330 UF 200V
C527	AE003233	CQGTB04S3K	CC	0.0056UF 50V B
C615	AE003280	E52H05010M	CE	1 UF 50V
C819	BZ110247	C0JBB0713K	CC	0.001 UF 2KV B
		DIODES		
D001	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77
D106	BZ410054	0021721150	LED	SLR-342VCT32
D403	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D404	BZ410066	D97U06R21B	DIODE,ZENER	MTZJ6.2B T-77
⚠D405	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
D406	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D408	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
D409	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
⚠D410	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
⚠D411	BZ410063	D2WTAU02A0	DIODE,SILICON	AU02A-EIC
⚠D412	BZ410020	D97U05R11B	DIODE,ZENER	MTZJ5.1B T-77
⚠D501	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D502	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D503	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D504	BZ410085	D2WXN40050	DIODE,SILICON	1N4005-EIC
⚠D505	BZ410010	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
D506	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
D507	BZ410067	D97U02R21B	DIODE,ZENER	MTZJ2.2B T-77
D508	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D509	AD300671	D97U01801B	DIODE,ZENER	MTZJ18B T-77
⚠D510	BZ410080	D2WXRU2AM0	DIODE SILICON	RU2AM-EIC
D511	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D512	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D513	BZ410010	D28T21DQN9	DIODE,SCHOTTKY	21DQ09N-TA2B1
D514	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		DIODES		
D515	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D516	AD300731	D2WXN49370	DIODE,SILICON	1N4937
D521	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D522	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D528	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D602	BZ410023	D97U09R11B	DIODE,ZENER	MTZJ9.1B T-77
D603	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D604	BZ410058	D97U08R21B	DIODE,ZENER	MTZJ8.2B T-77
D606	BZ410043	D2WT011E10	DIODE,SILICON	11E1-EIC
		ICS		
IC101	AE002802	I56F07091B	IC	OEC7091B
IC199	AE001534	A3M213B015	IC	S-24C02BDP-1A
⚠IC401	AE002783	I03TD804N0	IC	LA78040N-E
⚠IC501	BZ410088	0002E00610	PHOTO COUPLER	LTV-817M-VB
IC1001	BZ611001	I01DP75110	IC	
		TRANSISTORS		
Q105	BZ510086	TPATB03003	COMPOUND TRANSISTOR	KRA102MAT
⚠Q401	AD301779	TD3Q021400	TRANSISTOR,SILICON	TT2140LS-YBC11
⚠Q402	BZ510089	TC5T01627Y	TRANSISTOR,SILICON	2SC1627_Y(TPE2)
⚠Q501	BZ510093	TJXG5NC500	FET	STP5NC50FP
⚠Q502	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q503	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
Q505	BZ510073	TAATA12660	TRANSISTOR,SILICON	KTA1266-AT(Y,GR)
Q507	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q601	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q602	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q603	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q606	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q607	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q801	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q802	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
⚠Q803	BZ510091	TCA0042170	TRANSISTOR,SILICON	KTC4217(O,Y)
		COILS &TRANSFORMERS		
L001	AD300676	021LA63R3K	COIL	3.3 UH
L401	AD301644	021L75472J	COIL	4.7 MH
⚠L501	AD301395	029T000104	COIL,LINE FILTER	1R0A562F20
⚠L503	AE001529	028R200030	COIL,DEGAUSS	8R200030
T401	BZ310157	045009003J	TRANS,HORIZONTAL DRIVE	ETH09K14BZ
⚠T502	AE001531	048129109S	TRANSFORMER,SWITCHING	8129109S
		JACKS		
J702	AD300680	060Q401077	RCA JACK	AV1-09D-3
J703	AD300681	060Q401076	RCA JACK	AV1-09D-4
⚠J801	AD301147	066F120018	SOCKET,CATHODE RAY TUBE	ISMS01S
		SWITCHES		
SW101	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW102	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW103	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW104	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW105	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
		P.C.BOARD ASSEMBLIES		
PCB010	AE003281	A3M217J010	PCB ASS'Y	TMC558A
PCB110	AE003282	A3M217J110	PCB ASS'Y	TCC417A
		MISCELLANEOUS		
B502	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
B503	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
BT001	AE000012	1412004008	BATTERY,MANGAN	R03(AB)E_2P_G
BT002	AE000012	1412004008	BATTERY,MANGAN	R03(AB)E_2P_G
⚠CD501	AD300685	120R414903	CORD,AC BUSH	0R414903
CD801	BZ614378	06CU823001	CORD,CONNECTOR	CU823001
⚠CP401	BZ614303	069S450089	CONNECTOR PCB SIDE	A1561WV2-A5P
⚠CP502	AD300687	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P
CP503	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100
CP601	AD301329	069E260659	CONNECTOR PCB SIDE	00_8283_0611_00_00
CP801	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P
CD101A	AE001532	06CH013202	CORD,CONNECTOR	CH013202
CD101B	AE001533	06CH013203	CORD,CONNECTOR	CH013203
CP802A	BZ614276	067U005049	WIRE HOLDER	B2013H02-5P
CP802B	BZ614276	067U005049	WIRE HOLDER	B2013H02-5P
CP803A	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P
CP803B	BZ614334	067U004029	WIRE HOLDER	B2013H02-4P
EL001	BZ614043	124116281A	EYE LET	XRY16X28BD

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		MISCELLANEOUS		
EL002	BZ614044	124120301A	EYE LET	XRY20X30BD
⚠F501	AD302166	081PC04005	FUSE	51MS040L
⚠FB401	AE003283	043220061F	TRANSFORMER,FLYBACK	FQI20B103_M
FH501	AE002634	06710T0009	HOLDER,FUSE	EYF-52BCY
FH502	AE002634	06710T0009	HOLDER,FUSE	EYF-52BCY
OS101	AD301048	0773071001	REMOTE RECEIVER	RPM7138-WH5
S101	AD301450	WBL6032038	FLAT CABLE AWM2468 A	WG26 4C BLACK 320MM
S102	BZ614310	WCL6844038	FLAT CABLE AWM2468 A	WG26 5C GRAY 440MM
SP1001	AD300689	070Y132018	SPEAKER	S08F21
⚠TH501	AD302000	D8EE0B1400	DEGAUSS ELEMENT	B59203-S1060-B14
TM101	AD301335	076N0EH020	TRANSMITTER	RC-EH020
⚠TU001	AE001528	0163100007	RF UNIT	ENG36A01GR
⚠V801	AD301399	098Y200484	CRT W/DY	A48LGS30X19N35
	AD302003	100CT3R505	CRYSTAL	HC-49/C

RESISTOR

RC.....	CARBON RESISTOR

CAPACITORS

CC.....	CERAMIC CAPACITOR
CE.....	ALUMI ELECTROLYTIC CAPACITOR
CP.....	POLYESTER CAPACITOR
CPP.....	POLYPROPYLENE CAPACITOR
CPL.....	PLASTIC CAPACITOR
CMP.....	METAL POLYESTER CAPACITOR
CMPL.....	METAL PLASTIC CAPACITOR
CMPP.....	METAL POLYPROPYLENE CAPACITOR

TOSHIBA CORPORATION
1-1, SHIBAURA 1-CHOME, MINATO-KU, TOKYO 105-8001, JAPAN